

Plasma Fairings for Quieting Aircraft Landing Gear Noise, Phase II

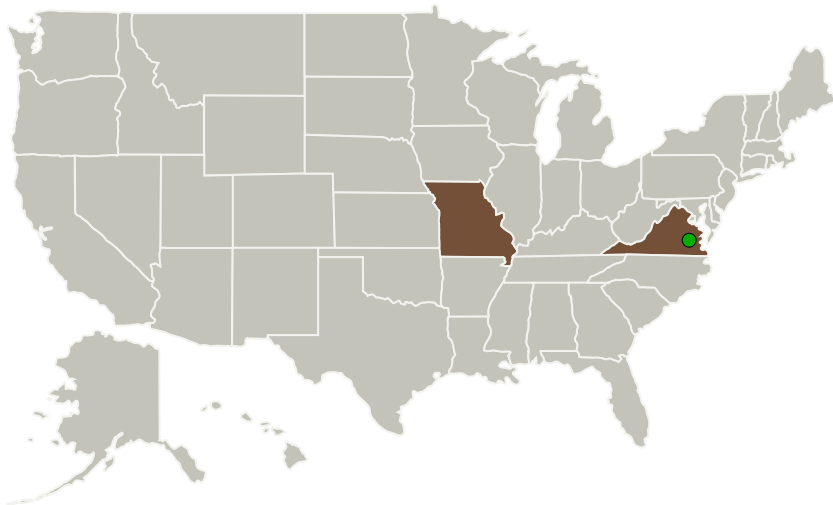
Completed Technology Project (2014 - 2016)



Project Introduction

This Phase II SBIR project deals with the design, development, and testing of a "Plasma Fairing" to reduce noise on the Gulfstream G550 landing gear. The plasma fairing will use single dielectric barrier discharge (SDBD) plasma actuators to reduce flow- separations and impingement around the landing gear, which are the dominant sources of landing gear noise. The Phase I project successfully demonstrated the feasibility of the plasma fairing concept on a generalized tandem cylinder configuration that shared important features of key sections of the G550 landing gear, specifically the relationship between the strut and the torque arm. The Phase II extends the concept to a more complex geometry: G550 landing gear. We will develop aeroacoustic simulations using University of Notre Dame's state-of-the-art plasma actuator model and Exa Corporation's flow solver PowerFLOW, coupled with experiments in an anechoic wind tunnel with both aerodynamic and acoustic measurements on a scaled G550 nose gear model to design and optimize a Plasma Fairing configuration that provides significant noise reduction on the G550 landing gear. We anticipate a technology readiness level (TRL) of 5 at the end of the Phase II project.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Innovative Technology Applications Co.	Lead Organization	Industry	Chesterfield, Missouri
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Missouri	Virginia

Project Transitions

**April 2014:** Project Start**April 2016:** Closed out

Closeout Summary: Plasma Fairings for Quieting Aircraft Landing Gear Noise, Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/137623>)

Images

**Briefing Chart Image**

Plasma Fairings for Quieting Aircraft Landing Gear Noise, Phase II
(<https://techport.nasa.gov/image/135797>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Technology Applications Co.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

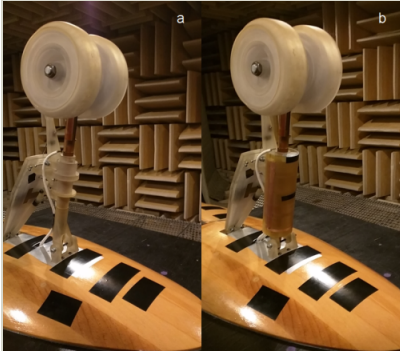
Christopher C Nelson

Co-Investigator:

Chris Nelson

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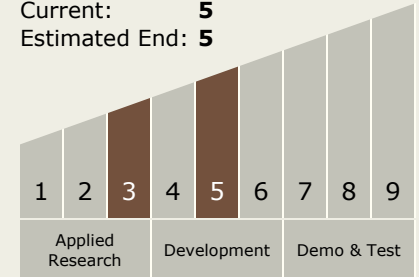


Final Summary Chart Image

Plasma Fairings for Quieting Aircraft
Landing Gear Noise, Phase II
Project Image
(<https://techport.nasa.gov/image/132297>)

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - TX15.1 Aerosciences
 - TX15.1.4 Aeroacoustics

Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System